

□ **Hard Handoff:** "Break-before-make" switch between cells; disconnects from one before connecting to another.

□ **Soft Handoff:** "Make-before-break" switch; connects to new cell before disconnecting from the old one.

Handoff: The process of transferring an active call or data session from one cell to another without interruption.

- **Types:**

- **Hard Handoff:** Breaks connection with the current cell before connecting to the new one.
- **Soft Handoff:** Maintains connections with both cells during the transition.

□ **Co-Channel Interference:** Interference from neighboring cells using the same frequency.

□ **Adjacent Channel Interference:** Interference from signals in nearby frequency bands.

In telecommunications, a **channel** refers to a medium or pathway through which signals are transmitted. Key points include:

- **Types of Channels:**

- **Voice Channel:** Carries voice signals for communication.
- **Data Channel:** Transmits data signals for computer or internet communications.
- **Control Channel:** Carries signaling information to manage communication sessions and network functions.

- **Characteristics:**

- **Bandwidth:** The range of frequencies a channel can carry, determining the amount of data transmitted.
- **Capacity:** The maximum data rate the channel can support.
- **Usage:** Channels can be physical (like wires and fibers) or logical (like frequency bands and time slots in multiplexing). They are essential for establishing communication between devices in a network.

□ **Trunking & GoS:** Trunking maximizes resource use by sharing channels, with Grade of Service (GoS) indicating call-blocking probability.

□ **Set-Up Time:** Time needed to establish a connection.

□ **Holding Time:** Duration a call is active.

□ **Traffic Intensity:** Measure of network load, often in Erlangs.

□ **Load:** Total network traffic volume.

□ **Request Rate:** Frequency of call requests.

□ **Cell Splitting:** Dividing cells to increase capacity.

□ **Sectoring:** Using directional antennas to split a cell into sectors, reducing interference.

□ **Radio Wave Propagation:** Transmission behavior of radio waves across various mediums.

□ **Space Propagation Models:** Models predicting signal behavior over space.

□ **Basic Propagation Mechanisms:** Includes reflection, diffraction, and scattering.

□ **Reflection:** Waves bounce back from a surface.

□ **Diffraction:** Waves bend around obstacles or openings.

□ **Scattering:** Waves spread in different directions due to particles or irregularities.

□ **1 Erlang:** Represents continuous use of one channel for one hour (full utilization of one channel).

□ **0.5 Erlangs:** Indicates that one channel is utilized for half the time (on average, two calls can be handled, each lasting half the time of the channel's availability).

□ **Cluster:** A group of interconnected servers or devices working together.

□ **Load Balancing:** Distributes workloads for optimized resource use.

□ **High Availability:** Provides redundancy; if one server fails, others take over.

□ **Scalability:** Allows easy addition of servers to handle increased loads.

□ **Types:**

- Compute Clusters (high-performance computing)
- Storage Clusters (large data management)
- Database Clusters (distributing database loads)

□ **Voice Channel:** A communication path for transmitting voice signals; used for actual voice calls in telecommunication systems.

□ **Control Channel:** A communication path for transmitting signaling information; used to manage and control the setup and termination of voice channels and other network functions.

n telecommunications, a **cell** refers to a specific geographic area covered by a cell tower or base station in a mobile network. Key points include:

- **Cellular Network:** Composed of multiple cells, allowing efficient frequency reuse and coverage.
- **Cell Types:**
 - **Macro Cell:** Covers a large area and provides wide-ranging coverage.
 - **Micro Cell:** Covers a smaller area, typically used to enhance capacity in high-density regions.
 - **Pico Cell:** Covers an even smaller area, often used indoors or in specific locations.
- **Handovers:** As a mobile device moves, it can switch from one cell to another for continuous service.
- **Frequency Reuse:** Different cells can use the same frequency channels, maximizing spectrum efficiency.

□ **Base Station:** Provides wireless coverage to a cell and connects mobile devices to the network.

□ **MTSO (Mobile Telephone Switching Office):** Manages connections, handoffs, and routing for calls within a mobile network.

□ **Roamer:** A mobile user who is accessing a network outside their home network area.

□ **1G, 2G, 2.5G, 3G:**

- **1G:** Analog voice-only network.
- **2G:** Digital network with SMS support.

- **2.5G:** Intermediate step with limited data capability (e.g., GPRS).
- **3G:** Higher-speed data with multimedia support.

□ **Frequency Reuse:** Technique to use the same frequencies in different cells, reducing interference.

□ **Handoff:** Transition of a call or data session between cells.

□ **Channel Allocation Techniques:** Methods to assign frequency channels to users, like Fixed, Dynamic, or Hybrid allocation.

□ **Cellular Network:** A wireless communication network divided into cells, each covered by a base station.

□ **AMPS (Advanced Mobile Phone System):** First-generation analog cellular technology.

□ **Sectoring:** Splitting a cell into sectors to improve capacity and reduce interference.

- **Mobile IP:** Protocol allowing seamless movement across networks.
- **WML (Wireless Markup Language):** Used to display content on wireless devices.

□ **Paging:** Process to alert a mobile device of an incoming call.

- **Cordless Telephone:** Wireless phone with limited range, usually for home use.

□ **Path Loss Model:** Predicts signal loss over distance due to obstacles and other factors.

□ **Capacity Expansion:** Techniques to increase network capacity, like cell splitting and frequency reuse.

□ **Spread Spectrum:** Signal transmission technique that spreads signals over a wide frequency band, reducing interference.

□ **Other Key Terms:**

- **Control Channel:** Manages network instructions (e.g., setup calls).
- **Forward Channel:** Channel from base station to mobile device.
- **Full Duplex System:** Allows simultaneous two-way communication.
- **Half Duplex System:** Only allows one-way communication at a time.
- **Mobile Station:** User's device in the network.
- **Mobile Switching Center (MSC):** Manages switching between base stations.
- **Simplex System:** One-way communication only.
- **Subscriber:** A registered user in the network.
- **Transceiver:** Device capable of both transmitting and receiving.